



Herbert, G., Perry, R., Andersen, H. K., Atkinson, C., Penfold, C., Lewis, S. J., Ness, A. R., & Thomas, S. (2019). Early enteral nutrition within 24 hours of lower gastrointestinal surgery versus later commencement for length of hospital stay and postoperative complications. *Cochrane Database of Systematic Reviews*, 10(7), [CD004080]. <https://doi.org/10.1002/14651858.CD004080.pub4>

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[10.1002/14651858.CD004080.pub4](https://doi.org/10.1002/14651858.CD004080.pub4)

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## **Early enteral nutrition within 24 hours of lower gastrointestinal surgery versus later commencement for length of hospital stay and postoperative complications (Review)**

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*Cochrane Database of Systematic Reviews* 2018, Issue 10. Art. No.: CD004080.

DOI: 10.1002/14651858.CD004080.pub3.

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[Intervention Review]

# Early enteral nutrition within 24 hours of lower gastrointestinal surgery versus later commencement for length of hospital stay and postoperative complications

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**Editorial group:** Cochrane Colorectal Cancer Group.

**Publication status and date:** New search for studies and content updated (conclusions changed), published in Issue 10, 2018.

**Citation:** Herbert G, Perry R, Andersen HK, Atkinson C, Penfold C, Lewis SJ, Ness AR, Thomas S. Early enteral nutrition within 24 hours of lower gastrointestinal surgery versus later commencement for length of hospital stay and postoperative complications. *Cochrane Database of Systematic Reviews* 2018, Issue 10. Art. No.: CD004080. DOI: 10.1002/14651858.CD004080.pub3.

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## ABSTRACT

### Background

This is an update of the review last published in 2011. It focuses on early postoperative enteral nutrition after lower gastrointestinal surgery. Traditional management consisted of 'nil by mouth', where patients receive fluids followed by solids after bowel function has returned. Although several trials have reported lower incidence of infectious complications and faster wound healing upon early feeding, other trials have shown no effect. The immediate advantage of energy intake (carbohydrates, protein or fat) could enhance recovery with fewer complications, and this warrants a systematic evaluation.

### Objectives

To evaluate whether early commencement of postoperative enteral nutrition (within 24 hours), oral intake and any kind of tube feeding (gastric, duodenal or jejunal), compared with traditional management (delayed nutritional supply) is associated with a shorter length of hospital stay (LoS), fewer complications, mortality and adverse events in patients undergoing lower gastrointestinal surgery (distal to the ligament of Treitz).

### Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL, the Cochrane Library 2017, issue 10), Ovid MEDLINE (1950 to 15 November 2017), Ovid Embase (1974 to 15 November 2017). We also searched for ongoing trials in ClinicalTrials.gov and World Health Organization International Clinical Trials Registry Platform (15 November 2017). We handsearched reference lists of identified studies and previous systematic reviews.

### Selection criteria

We included randomised controlled trials (RCT) comparing early commencement of enteral nutrition (within 24 hours) with no feeding in adult participants undergoing lower gastrointestinal surgery.

## Data collection and analysis

Two review authors independently assessed study quality using the Cochrane 'Risk of bias' tool tailored to this review and extracted data. Data analyses were conducted according to the Cochrane recommendations.

We rated the quality of evidence according to GRADE.

Primary outcomes were LoS and postoperative complications (wound infections, intraabdominal abscesses, anastomotic dehiscence, pneumonia).

Secondary outcomes were: mortality, adverse events (nausea, vomiting), and quality of life (QoL).

LoS was estimated using mean difference (MD (presented as mean  $\pm$  SD). For other outcomes we estimated the common risk ratio (RR) and calculated the associated 95% confidence intervals. For analysis, we used an inverse-variance random-effects model for the primary outcome (LoS) and Mantel-Haenszel random-effects models for the secondary outcomes. We also performed Trial Sequential Analyses (TSA).

## Main results

We identified 17 RCTs with 1437 participants undergoing lower gastrointestinal surgery. Most studies were at high or unclear risk of bias in two or more domains. Six studies were judged as having low risk of selection bias for random sequence generation and insufficient details were provided for judgement on allocation concealment in all 17 studies. With regards to performance and deception bias; 14 studies reported no attempt to blind participants and blinding of personnel was not discussed either. Only one study was judged as low risk of bias for blinding of outcome assessor. With regards to incomplete outcome data, three studies were judged to be at high risk because they had more than 10% difference in missing data between groups. For selective reporting, nine studies were judged as unclear as protocols were not provided and eight studies had issues with either missing data or incomplete reporting of results.

LOS was reported in 16 studies (1346 participants). The mean LoS ranged from four days to 16 days in the early feeding groups and from 6.6 days to 23.5 days in the control groups. Mean difference (MD) in LoS was 1.95 (95% CI, -2.99 to -0.91,  $P < 0.001$ ) days shorter in the early feeding group. However, there was substantial heterogeneity between included studies ( $I^2 = 81\%$ ,  $\text{Chi}^2 = 78.98$ ,  $P < 0.00001$ ), thus the overall quality of evidence for LoS is low. These results were confirmed by the TSA showing that the cumulative Z-curve crossed the trial sequential monitoring boundary for benefit.

We found no differences in the incidence of postoperative complications: wound infection (12 studies, 1181 participants, RR 0.99, 95%CI 0.64 to 1.52, very low-quality evidence), intraabdominal abscesses (6 studies, 554 participants, RR 1.00, 95%CI 0.26 to 3.80, low-quality evidence), anastomotic leakage/dehiscence (13 studies, 1232 participants, RR 0.78, 95%CI 0.38 to 1.61, low-quality evidence; number needed to treat for an additional beneficial outcome (NNTB) = 100), and pneumonia (10 studies, 954 participants, RR 0.88, 95%CI 0.32 to 2.42, low-quality evidence; NNTB = 333).

Mortality was reported in 12 studies (1179 participants), and showed no between-group differences (RR = 0.56, 95%CI, 0.21 to 1.52,  $P = 0.26$ ,  $I^2 = 0\%$ ,  $\text{Chi}^2 = 3.08$ ,  $P = 0.96$ , low-quality evidence). The most commonly reported cause of death was anastomotic leakage, sepsis and acute myocardial infarction.

Seven studies (613 participants) reported vomiting (RR 1.23, 95%CI, 0.96 to 1.58,  $P = 0.10$ ,  $I^2 = 0\%$ ,  $\text{Chi}^2 = 4.98$ ,  $P = 0.55$ , low-quality evidence; number needed to treat for an additional harmful outcome (NNTH) = 19), and two studies (118 participants) reported nausea (RR 0.95, 0.71 to 1.26, low-quality evidence). Four studies reported combined nausea and vomiting (RR 0.94, 95%CI 0.51 to 1.74, very low-quality evidence). One study reported QoL assessment; the scores did not differ between groups at 30 days after discharge on either QoL scale EORTC QLQ-C30 or EORTC QLQ-OV28 (very low-quality evidence).

## Authors' conclusions

This review suggests that early enteral feeding may lead to a reduced postoperative LoS, however cautious interpretation must be taken due to substantial heterogeneity and low-quality evidence. For all other outcomes (postoperative complications, mortality, adverse events, and QoL) the findings are inconclusive, and further trials are justified to enhance the understanding of early feeding for these. In this updated review, only a few additional studies have been included, and these were small and of poor quality.

To improve the evidence, future trials should address quality issues and focus on clearly defining and measuring postoperative complications to allow for better comparison between studies. However due to the introduction of fast track protocols which already include an early feeding component, future trials may be challenging. A more feasible trial may be to investigate the effect of differing postoperative energy intake regimens on relevant outcomes.

## PLAIN LANGUAGE SUMMARY

**The effect of having nutrition within the first 24 hours after bowel surgery on length of hospital stay and postoperative complications**

### Review question

To look at whether feeding patients early after surgery via their stomach (also known as gastrointestinal surgery) can help them to leave hospital sooner with fewer complications.

### Background

Traditionally, after gastrointestinal surgery, it was usual for patients not to be given any food until their bowel regained some function (e.g. bowel sounds, passing wind, bowel motion). Studies have looked at whether feeding patients sooner after surgery can help reduce complications (e.g. pneumonia), but there are mixed results. It is important to do this update of the review because the evidence in previous reviews is not extensive. The relevance of early feeding following its incorporation within a programme of patient care (also known as the enhanced recovery after surgery (ERAS)), remains an important question to answer.

### Study characteristics

This review found 17 relevant studies that recruited 1437 participants in total who had undergone lower gastrointestinal surgery (distal to the ligament of Treitz).

### Key results

We found evidence that patients who received nutrition within the first 24 hours after their surgery were able to leave hospital almost two days sooner than those patients who were not given any nutrition until their bowel activity returned. However, the quality of the evidence is low and therefore early feeding after surgery may not lead to patients leaving hospital sooner. They may also have a reduced risk of dying. However, we found weak evidence that patients who were given nutrition within the first day after their operation were more at risk of vomiting. There were no differences in complication rates (such as wound infection or pneumonia) between patients who were fed early and those that were not.

### Quality of the evidence

All studies were of low quality, which may mean their results are less reliable. To explore further early feeding after surgery, more studies are needed which are larger and of better quality.